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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/767,756	01/28/2004	Masanobu Sato	P/2699-32	5571
2352 7590 10/27/2008 OSTROLENK FABER GERB & SOFFEN 1180 AVENUE OF THE AMERICAS NEW YORK, NY 100368403				
EXAMINER				
BLAN, NICOLE R				
ART UNIT		PAPER NUMBER		
1792				
MAIL DATE		DELIVERY MODE		
10/27/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/767,756

**Applicant(s)**

SATO ET AL.

**Examiner**

NICOLE BLAN

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 3, 4, 18 and 20-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 18 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date 07222008
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

1. The declaration under 37 CFR 1.132 filed August 19, 2008 is insufficient to overcome the rejection of claims 1, 3-4, 18 and 20-24 based upon 35 U.S.C. 102(a/b) and 35 U.S.C. 103 as set forth in the last Office action because:

Kanno teaches in the second embodiment as cited in the office action mailed on March, 19, 2008 that all the particles are 10  $\mu\text{m}$ ; therefore, no matter how the particle diameter is expressed, all of the particles will be 10  $\mu\text{m}$  in size. Thus, Kanno reads on the claimed diameter limitations.

Regarding Izumi, Izumi teaches that the size distribution of the droplets is result effective based on the flow rates of the liquid and gas into the nozzle. In other words, the diameter of the droplets can be optimized by varying the flow rates of the liquid and gas into the nozzle. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the optimum diameter of the droplets in the absence of unexpected results, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

In view of the foregoing, when all of the evidence is considered, the totality of the rebuttal evidence of nonobviousness fails to outweigh the evidence of obviousness.

***Response to Arguments***

2. Applicant's arguments filed August 19, 2008 have been fully considered but they are not persuasive.

In response to applicant's argument regarding the diameters relied upon in the prior art, please refer to the arguments addressed above.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
6. **Claims 1, 3-4, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kanno et al. (U.S. Patent 5,918,817).**

Claims 1 and 3-4: Kanno teaches a method of treating a semiconductor substrate [col. 1, lines 8-15]. The method of Kanno comprises generating droplets of a treatment liquid by mixing the treatment liquid with a gas [col. 7, lines 3-14], wherein the particle size of the droplet is about 10  $\mu\text{m}$  [reads on "volume median diameter" and on the range claimed in claim 1; col. 14, lines 22-30]; impinging the droplets on a surface of the substrate [col. 1, lines 8-15; col. 4, lines 20-24; col. 7, lines 3-14]. With regard to claims 3 and 4, since Kanno teaches supplying the treatment liquid at a flow rate of about 100 ml/min [col. 9, lines 37-45; col. 10, lines 45-48], which is identical to the flow rate of claim 4, since Kanno teaches the droplet size of about 10  $\mu\text{m}$  [col. 14, lines 22-30], which is within the instantly claimed ranges, the flow rate of the gas for generating such droplets would inherently be within the range as per claim 3.

Furthermore, even if the reference to Kanno is removed from the scope of 35 U.S.C. 102 (b) rejection with regard to claims 3 and 4, one skilled in the art still obviously will come to the gas supply pressure, which corresponds to the gas amount and, therefore, gas flow rate as claimed in order to produce liquid droplets of about 10  $\mu\text{m}$  while supplying a treatment liquid into the cleaning jet nozzle of Kanno at the rate of about 100ml/min.

Claim 18: Kanno teaches a substrate treatment method as set forth in claim 1, wherein the droplet generating step includes the step of generating the droplets of the treatment liquid by using a bifluid nozzle [(30), Fig. 12, col. 13, line 40] having: a casing [(31 and 32), Fig. 12, col. 13, lines 43-47]; a liquid outlet port for discharging a treatment liquid [(3), Fig. 12, col. 13, line 53]; and a gas outlet port for discharging a gas [space between (32) and (33) as well as space between (34) and above (3), Fig. 12, col. 13, lines 43-53]; whereto the bifluid nozzle is adapted to introduce the treatment liquid and the gas into the casing [col. 13, lines 63-67], generate the droplets of the treatment liquid by spraying the gas discharged from the gas outlet port over the treatment liquid discharged from the liquid outlet port outside the casing, and the spout the droplets on the surface of the substrate [Fig. 12, col. 13, lines 40-67; col. 14, lines 1-33].

**7. Claims 1, 3-4, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Izumi et al. (U.S. PGPub 2003/0170988), and as evidenced by Kanno.**

Claims 1 and 3-4: Izumi teaches a substrate treatment method comprising generating droplets of a treatment liquid by mixing the treatment liquid with compressed air in a bi-fluid nozzle; impinging the droplets on a surface of the substrate, wherein the flow rate of the compressed air introduced into the bi-fluid nozzle is 50 to 100 ml/min [page 9, paragraph 131, lines 4-6], and the flow rate of the treatment liquid introduced into the bi-fluid nozzle is 100 to 150 ml/min [page 9, paragraph 131, lines 6-8].

Izumi teaches that the droplets of the treatment liquid provided under such conditions each had a diameter of about 5 to about 20  $\mu\text{m}$  [page 9, paragraph 131]; however, Izumi does not explicitly teach the claimed diameter size. However, Kanno teaches that a median diameter size

for droplets of about 10  $\mu\text{m}$  [col. 14, lines 22-30] is conventionally known in the art. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to optimize the median diameter, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955).

Claim 18: Izumi and Kanno teach the limitations of claim 1 above. Izumi also teaches that the droplet generating step includes the step of generating the droplets of the treatment liquid by using a bifluid nozzle [(68), Fig. 2, page 2, paragraph 33; page 4, paragraph 60] having: a casing [(34 and 39), Fig. 2, page 4, paragraph 61]; a liquid outlet port for discharging a treatment liquid [(39a), Fig. 2, page 4, paragraph 62]; and a gas outlet port for discharging a gas [(34a), Fig. 2, page 4, paragraph 62]; whereto the bifluid nozzle is adapted to introduce the treatment liquid [(37c), Fig. 2] and the gas into the casing [(37d), Fig. 2, page 4, paragraph 63], generate the droplets of the treatment liquid by spraying the gas discharged from the gas outlet port over the treatment liquid discharged from the liquid outlet port outside the casing, and the spout the droplets on the surface of the substrate [Fig. 2, pages 4-5, paragraphs 61-65].

**8. Claims 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kanno, and in view of Izumi.**

Claims 20-23: Kanno teaches a method of treating a semiconductor substrate [col. 1, lines 8-15]. The method of Kanno comprises generating droplets of a treatment liquid [reads on “water” in claim 24; col. 3, lines 26-31; col. 20, lines 3-5 and 45-46] by mixing the treatment

liquid with a gas [col. 7, lines 3-14], wherein the particle size of the droplet is about 10  $\mu\text{m}$  [reads on “volume median diameter” and on the range claimed in claims 20 and 21; col. 14, lines 22-30]; impinging the droplets on a surface of the substrate [col. 1, lines 8-15; col. 4, lines 20-24; col. 7, lines 3-14].

With regard to claims 22 and 23, since Kanno teaches supplying the treatment liquid at a flow rate of about 100 ml/min [col. 9, lines 37-45; col. 10, lines 45-48], which is identical to the flow rate of claim 23, since Kanno teaches the droplet size of about 10  $\mu\text{m}$  [col. 14, lines 22-30], which is within the instantly claimed ranges, the flow rate of the gas for generating such droplets would inherently be within the range as per claim 22.

Kanno does not explicitly teach the type of gas used in the bi-fluid nozzle. However, Izumi teaches a similar method for treating a substrate using a pressurized gas consisting of Nitrogen [page 2, paragraph 26, lines 3-5]. Thus, it would have been obvious to a person of ordinary skill in the art to use the gas disclosed by Izumi in an attempt to provide an improved method for treating substrates, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp. In turn, because the method of cleaning as claimed has the properties predicted by the prior art, it would have been obvious to use the nitrogen gas disclosed by Izumi in the nozzle of Kanno.

Claim 24: Kanno teaches a substrate treatment method as set forth in claim 20, wherein the droplet generating step includes the step of generating the droplets of the treatment liquid by using a bifluid nozzle [(30), Fig. 12, col. 13, line 40] having: a casing [(31 and 32), Fig. 12, col. 13, lines 43-47]; a liquid outlet port for discharging a treatment liquid [(3), Fig. 12, col. 13, line



53]; and a gas outlet port for discharging a gas [space between (32) and (33) as well as space between (34) and above (3), Fig. 12, col. 13, lines 43-53]; where to the bifluid nozzle is adapted to introduce the treatment liquid and the gas into the casing [col. 13, lines 63-67], generate the droplets of the treatment liquid by spraying the gas discharged from the gas outlet port over the treatment liquid discharged from the liquid outlet port outside the casing, and the spout the droplets on the surface of the substrate [Fig. 12, col. 13, lines 40-67; col. 14, lines 1-33].

### ***Conclusion***

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE BLAN whose telephone number is (571)270-1838. The examiner can normally be reached on Monday - Thursday 8-5 and alternating Fridays 8-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/N. B./  
Examiner, Art Unit 1792

/Michael Cleveland/  
Supervisory Patent Examiner, Art Unit 1792